

Claims

1. Device for administration of a substance to a mammal by means of inhalation, comprising:
 - aerosol means, for creating an aerosol,
 - control means, for manipulating the aerosol in order to thereby control the particle size of the aerosol, wherein
 - the device is provided with supply means for adding a substance to the aerosol, prior to or upon release of the aerosol from the device.
- 5 10 2. Device according to claim 1, wherein the aerosol means comprises a mist generator.
3. Device according to claim 1, wherein the aerosol means comprises a catalytic burner, such as a fuel cell.
- 15 20 4. Device according to one of the preceding claims, wherein the device comprises an aerosol chamber for creating the aerosol in said chamber.
5. Device according to one of the preceding claims, wherein the control means are adapted to add energy to or remove energy from the aerosol in order to thereby control the particle size of the aerosol.
- 25 30 6. Device according to claim 5, wherein the control means comprises a condensation chamber.
7. Device according to claim 6, wherein the condensation chamber has a first open end to receive a flow and a second open end to release a flow.
8. Device according to claims 4 and 6 or 7, wherein the condensation chamber adjoins the aerosol chamber.
9. Device according to any of the claims 5 - 8, wherein the control means comprises a heat exchanger provided with apertures for allowing the aerosol to pass through the heat exchanger.

10. Device according to any of the claims 5 - 9, wherein the device comprises a Peltier-element, positioned in the condensation chamber, to retrieve condensation energy.

11. Device according to one of the preceding claims, wherein the control means comprises
5 dilution means for mixing the aerosol with a fluid, such as an unsaturated gas, for thereby
decreasing the dew point of the aerosol.

12. Device according to one of the preceding claims, wherein the supply means comprises
means for adding a gaseous substance to the aerosol.

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13. Device according to claim 12, wherein the supply means comprises a container, such as a
canister, for storing a gaseous substance.

14. Device according to one of the preceding claims, wherein the supply means comprises
15 means for adding a liquid substance to the aerosol.

15. Device according to claim 14, wherein the supply means comprises a membrane pump.

16. Device according to one of the preceding claims, wherein the supply means comprises
20 means for adding a solid substance to the aerosol.

17. Device according to claim 14 or 16, wherein the supply means comprises a container for
storing a propellant, such as CO₂, and a liquid and/or solid substance.

25 18. Device according to one of the preceding claims, wherein the device is adapted to be
breath actuated.

19. Device according to one of the claims 1-17, wherein the device is provided with means for
operating the device with a breath support.

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20. Device according to one of the preceding claims, wherein the control means are coupled
with process means, provided with storage means, for receiving and processing data relating
to a preferred state and condition of the aerosol to be administered.

21. Device according to claim 20 wherein the device is provided with sensor means, coupled with the process means, to measure data relating to the state and condition of the aerosol to be administered.

5 22. Device according to one of the preceding claims, wherein the supply means are coupled with process means, provided with storage means, for receiving and processing data relating to a preferred timing of the adding of the substance to the aerosol.

10 23. Device according to claim 22 wherein the device is provided with sensor means, coupled with the process means, to measure data relating to the timing of the adding of the substance to the aerosol.

24. Device according to claim 21 or 23, wherein the sensor means comprise flow measurement means for producing a measure of volume administered.

15 25. Method for the administration of a substance to a mammal by means of inhalation, comprising the steps of:
a) creating an aerosol,
b) manipulating the aerosol by adding or removing energy from the aerosol in order to
20 thereby control the particle size of the particles of the aerosol, and
c) administering the aerosol to the mammal,
wherein the method comprises the step of:
d) adding a substance to the aerosol, prior to the administration of the aerosol to the mammal, in order to administer the substance to the mammal by means of the aerosol.

25 26. Method according to claim 25, wherein the method comprises the steps of:
e) prior to step b) identifying a preferred target area in the respiratory tract and lungs for a substance to be administered to the mammal, and
f) calculating a preferred state and condition for the aerosol.

30 27. Method according to claim 25 or 26, wherein step d) is executed after the completion of step b).

28. Method according to claim 25 - 27, wherein step b) is repeated after the completion of step d).

29. Method according to claim 25 - 28, wherein the method comprises the step of:

5 g) measuring in real time the flow of a first amount of aerosol administered to the mammal, and

h) using the real time measurements in the device-mammal interface in order to control the manipulation of the aerosol in step b) prior to the administration of a second amount of aerosol to the mammal.

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30. Method according to claim 25 - 29, wherein the method comprises the step of:

i) prior to step b) evaluating the heat content of the aerosol in order to thereby determine the specific amount of energy to be added or extracted from the aerosol in order to realise the desired manipulation of the aerosol.

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31. Method according to claim 25 - 30, wherein the manipulation of the aerosol comprises a condensation step, for allowing condensation of at least part of the gaseous phase of the aerosol.

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32. Method according to claim 31, wherein the manipulation of the aerosol is adapted to obtain an aerosol with a relative humidity of 100%.

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33. Method according to claim 25 - 32, wherein the manipulation of the aerosol comprises a dilution step, for mixing the aerosol with a fluid, such as an unsaturated gas, for thereby decreasing the dew point of the aerosol.

34. Method according to claim 25 - 33, wherein the method comprises the step of:

j) using the results of steps e) and g) to calculate a preferred timing for the adding of the substance to the aerosol.

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35. Method according to claim 25 - 34, wherein the method comprises the step of creating in step a) an aerosol containing a first substance and adding in step d) a further substance to said aerosol.